Nesom, G.L. 2010. *Glandularia gooddingii* (Verbenaceae): Notes on distribution and variation. Phytoneuron 2010-54: 1–9.

GLANDULARIA GOODDINGII (VERBENACEAE): NOTES ON DISTRIBUTION AND VARIATION

GUY L. NESOM
2925 Hartwood Drive
Fort Worth, TX 76109
www.guynesom.com

ABSTRACT

The distribution of *Glandularia gooddingii* is mapped in detail in its USA range — California, Nevada, Utah, Arizona, and New Mexico. In New Mexico, it occurs in Hidalgo County, based on collections at UNM; records in other herbaria cited in literature for Bernalillo, Catron, DeBaca, Grant, Guadalupe, Lea, Luna, Otero, Sandoval, San Miguel, and Socorro counties, New Mexico, apparently are out of range for the species and are either known or presumed here to be some other species than *G. gooddingii*. Photos of representative plants illustrate the range in leaf variation, from coarsely toothed to bipinnately dissected.
KEY WORDS: *Glandularia gooddingii*, *Glandularia pubera*, distribution, USA

Glandularia gooddingii (Briq.) Solbrig is a distinctive species of the southwestern USA and adjacent Mexico, recognized by its coarsely toothed or incised to 3-lobed or bipinnatifid leaves, prominently stipitate-glandular stems and inflorescences, and large, showy corollas (pink to purple or lavender with broad limbs). It is known to be native in the USA in California, Nevada, Utah, Arizona, and New Mexico and in the Mexican states of Baja California, Baja California Sur, Sonora, and Sinaloa. The distribution of the species in the USA is shown in Fig. 1, the level of map detail mostly reflecting the large set of collections from ARIZ. The present report unequivocally documents its presence in New Mexico and notes previous misidentifications from that state.

Distribution in New Mexico.

Glandularia gooddingii was included in the New Mexico flora by Martin and Hutchins (1981) based only on a record from Dona Ana Co. Allred (2008) has based the entry for the species on the publication by Martin and Hutchins and on Umber (1979; but the attribution to Umber was mistaken, see below). All collections in the UNM herbarium, however, previously identified as *G. gooddingii* from New Mexico (Bernalillo, Grant, Otero, Sandoval, San Miguel, and Socorro counties) proved to be some other species. Apart from those putative UNM records, *G. gooddingi* has not been otherwise recorded from New Mexico by any of the herbaria in the SEINET consortium (SEINET 2010). A record from Lea Co., New Mexico, vouchered by a collection at Eastern New Mexico University in Portales (fide Kartesz 2010) is far out of range and surely is some other species.

Two collections, however, from extreme southwestern localities in New Mexico prove to be bona fide *Glandularia gooddingii*: **Hidalgo Co.**: [Peloncillo Mts.,] Guadalupe Canyon, canyon bottom, near sycamores and mesquite, 4000 ft, 27 Oct 1957, *Harris 44* (UNM); Peloncillo Mts., ca. 6600 ft, 22 Feb 1975, *Wagner 531* (UNM).

Umber (1979, Fig. 9) did not cite or map *Glandularia gooddingii* from New Mexico. He mapped it in southeastern Arizona only from Cochise Co., including the Chiricahua Mountains, immediately adjacent to Hidalgo Co., New Mexico. I have not seen a collection of *G. gooddingii* from other far-eastern Arizona counties (Apache, Greenlee), leaving Cochise County as the easternmost known locality for the species in Arizona (Fig. 1).

Moldenke (1963) reported *Glandularia gooddingii* from an unknown New Mexico county (*Rusby 337*, MICH) and explicitly from four counties: Catron Co.: *Goddard 825* (UC); Grant Co.: *Ballou s.n.* (DS), *Maguire et al. 11503* (NY), and *Mohr s.n.* (US); Otero Co.: *Cutler 2002* (UC); and DeBaca Co.: *Nelson 11307* (S). He later noted (1980), without documentation, that the species occurs in seven New Mexico counties: Catron, DeBaca, Grant, Guadalupe, Luna, Otero, and Sandoval. Most of these are clearly out of range for *G. gooddingii* and are either known or presumed to be some other species.

It is not implausible that *Glandularia gooddingii* occurs in Catron and Grant counties, but I have not seen any of the cited vouchers from there. The abundancy of inconsistent identifications of many *Glandularia* collections, however, and the apparent absence of *G. gooddingii* in far-eastern Arizona counties (except for Cochise Co.) at least suggest that the Catron and Grant collections also may be misidentified.

Distribution elsewhere.

Records included in Fig. 1 for Utah counties are from the Digital Atlas of the Vascular Plants of Utah (Ramsey et al. 2010). The record for Lincoln Co., Nevada is cited by Moldenke (1963): Calientes, 29 Apr 1904, *M.E. Jones s.n.* (POM). The type of *Glandularia gooddingii* apparently is from Clark County, close to the Lincoln County line.

A historical record exists for *Glandularia gooddingii* in San Diego Co., California, as cited by Perry (1933): "southern part of San Diego Co., 1875, *Palmer s.n.* (GH). Rebman and Simpson (2006) included the species in the appendix as reported for San Diego County but unvouchered/ unsubstantiated — this record derived from Beauchamp (1986), who noted that it is rare in San Diego County and known only from a vague locality in the Santa Rosa Mountains (perhaps alluding to the Palmer collection?). The probability of the occurrence in San Diego County is substantiated by the distribution of the species in Baja California, where it is documented from within about four kilometers south of the California border, from there south to the Sierra San Francisco of northern Baja California Sur (as mapped from specimens from multiple herbaria, fide BajaFlora 2010).

References to the presence of *Glandularia gooddingii* in Alabama, Colorado, Oklahoma, and Texas (Moldenke 1963, 1980) apparently have been based either on misidentifications or cultivated plants, as the species has not been documented in any recent floristic summaries for those states and I have seen no evidence of their existence there. The tentative report for Colorado by Harrington (1954) has been persistent and repeated in various other literature, but presence there of *G. gooddingii* has not been substantiated (Weber & Wittmann 1992, 2000; Hartman & Nelson 2001). Harrington's Colorado record presumably was based on a citation by Perry (1933): "southern Colorado, 1867, *Parry* (US)." Moldenke (1963) cited "*C.C. Parry 551*, in part" (US) from an undetermined Colorado locality.

Nomenclature.

Verbena gooddingii var. *nepetifolia* Tidestrom (the type from Clark Co., Nevada: El Dorado Cañon, 2 Apr 1919, *I. Tidestrom 8835* (holotype: US digital image!) has sometimes been recognized as a distinct taxon but now is considered, here and generally elsewhere, to be synonymous with the typical expression of the species (the type from Clark Co., Nevada: Kernan, Meadow Valley Wash, 28 Apr 1902, *L.N. Goodding 645* (isotypes: F digital image!, GH, US digital image!). *Glandularia wrightii* var. *intermedia* Moldenke (the type from Pima Co., Arizona, holotype: NY digital image!) also is a synonym of *V. gooddingii.* Other synonyms are *G. gooddingii* var. *intermedia* Moldenke, (type from Pima Co., Arizona), *Verbena verna* A. Nelson (type from Mohave Co., Arizona), *Verbena verna* var. *fissa* A. Nelson (type from San Bernadino Co., California), and *Verbena arizonica* Briq. (type from Mohave Co., Arizona).

Variation in leaf morphology.

Leaves in *Glandularia gooddingii* vary from coarsely toothed or lobed to incised, 3-lobed, or bipinnately divided — the range of variation is shown in Figs. 2-6. Those with merely toothed to shallowly lobed or incised leaves are distinctive and rarely if ever misidentified. Those with deeply dissected leaves may resemble plants of the *G. bipinnatifida* group, especially in Arizona where they are sympatric. In fact, evidence suggests that *G. gooddingii* may be closely related to *G. pubera* (Green) Nesom, which has bipinnatifid leaves with linear segments (see Nesom 2010 for a description of *G. gooddingii* and a key couplet that separates it from *G. pubera*). Both species have short floral bracts, densely stipitate-glandular calyces, short calyx lobes, and broad corolla limbs (10–14 mm in diam.). Some plants of *G. gooddingii*, especially among those with dissected leaves, have bright pink corollas similar in color to those of *G. pubera*.

Plants of *Glandularia gooddingii* with dissected leaves are mostly in the northeast portion of the range of the species, as shown in Fig. 1. The 'nepetifolia' morphology, with coarsely toothed leaves, is characteristic of most of the Mexican plants. There appears to be too much intergradation to maintain a formal taxonomic distinction, but the difference is worth further study, especially in view of the two ploidy levels reported for the species — tetraploid from Coconino Co., hexaploid from Baja California (summary in Umber 1979).

ACKNOWLEDGEMENTS

I am grateful to the staffs at TEX-LL and UNM for their hospitality while studying there, to Phil Jenkins for a discussion of *Glandularia gooddingii* in Arizona, Jon Rebman for information on *G. gooddingii* in San Diego County, to herbaria staff for arranging a loan of specimens from ARIZ to TEX, and to Amber Schoneman at TEX for the photos of the specimens in Figs. 2–6. The present study has been supported in part under contract from the Flora of North America Association, in conjunction with preparation of the taxonomic treatment of Verbenaceae for FNANM.

LITERATURE CITED

Allred, K.W. 2008. Flora Neomexicana I: The Vascular Plants of New Mexico. lulu.com

BajaFlora. 2010. The Flora of Baja California. San Diego Natural History Museum, Botany Department. San Diego, California. <http://bajaflora.org/>

Beauchamp, R.M. 1986. A Flora of San Diego County, California. Sweetwater River Press, National City, California.

Harrington, H.D. 1954. Manual of the Plants of Colorado. Sage Books, Denver, Colorado.

Hartman, R.L. and B.E. Nelson. 2001. A checklist of the vascular plants of Colorado. Rocky Mountain Herbarium, Univ. of Wyoming, Laramie. <http://www.rmh.uwyo.edu/data/co_checklist.pdf>

Kartesz, J.T. 2010. Floristic Synthesis of North America. Version 2.0, unpublished, 11 March 2010.

Martin, W.C. and C.R. Hutchins. 1981. A Flora of New Mexico, Vol. 2. J. Kramer, Vaduz, Germany.

Moldenke, H.N. 1963. Materials toward a monograph of the genus *Verbena*. XI. Phytologia 9: 113–181. [*Verbena gooddingii*, pp. 131–146]

Moldenke, H.N. 1980. A sixth summary of the Verbenaceae, Avicenniaceae, Stilbaceae, Chloanthaceae, Symphoremaceae, Nyctanthaceae, and Eriocaulaceae of the world as to valid taxa, geographic distribution and synonymy. Phytologia Memoirs, Vol. 2. Plainfield, New Jersey.

Nesom, G.L. 2010. Taxonomy of the *Glandularia bipinnatifida* group (Verbenaceae) in the USA. Phytoneuron 2010–46: 1–19.

Perry, L.M. 1933. A revision of the North American species of *Verbena*. Ann. Missouri Bot. Gard. 20: 239–362.

Ramsey, R.D., T. Tilton, B.B. Banner, and A. Falconer. 2010. Digital Atlas of the Vascular Plants of Utah. Dept. of Geography and Earth Resources, Utah State University, Logan.

<http://earth.gis.usu.edu/plants/>
SEINET. 2010. Southwest Environmental Information Network. Managed at Arizona State Univ., Tempe. <http://swbiodiversity.org/seinet/index.php>
Rebman, J. and M.G. Simpson. 2006. Checklist of the Vascular Plants of San Diego County (ed. 4). San Diego Natural History Museum, San Diego, California.
Umber, R.E. 1979. The genus *Glandularia* (Verbenaceae) in North America. Syst. Bot. 4: 72–102.
Weber, W.A. and R.C. Wittmann. 1992, 2000. Catalog of the Colorado Flora: A Biodiversity Baseline. Univ. Press of Colorado, Niwot. [Revised electronic version, 2000] <http://cumuseum.colorado.edu/Research/Botany/Databases/vascular_plants.pdf>

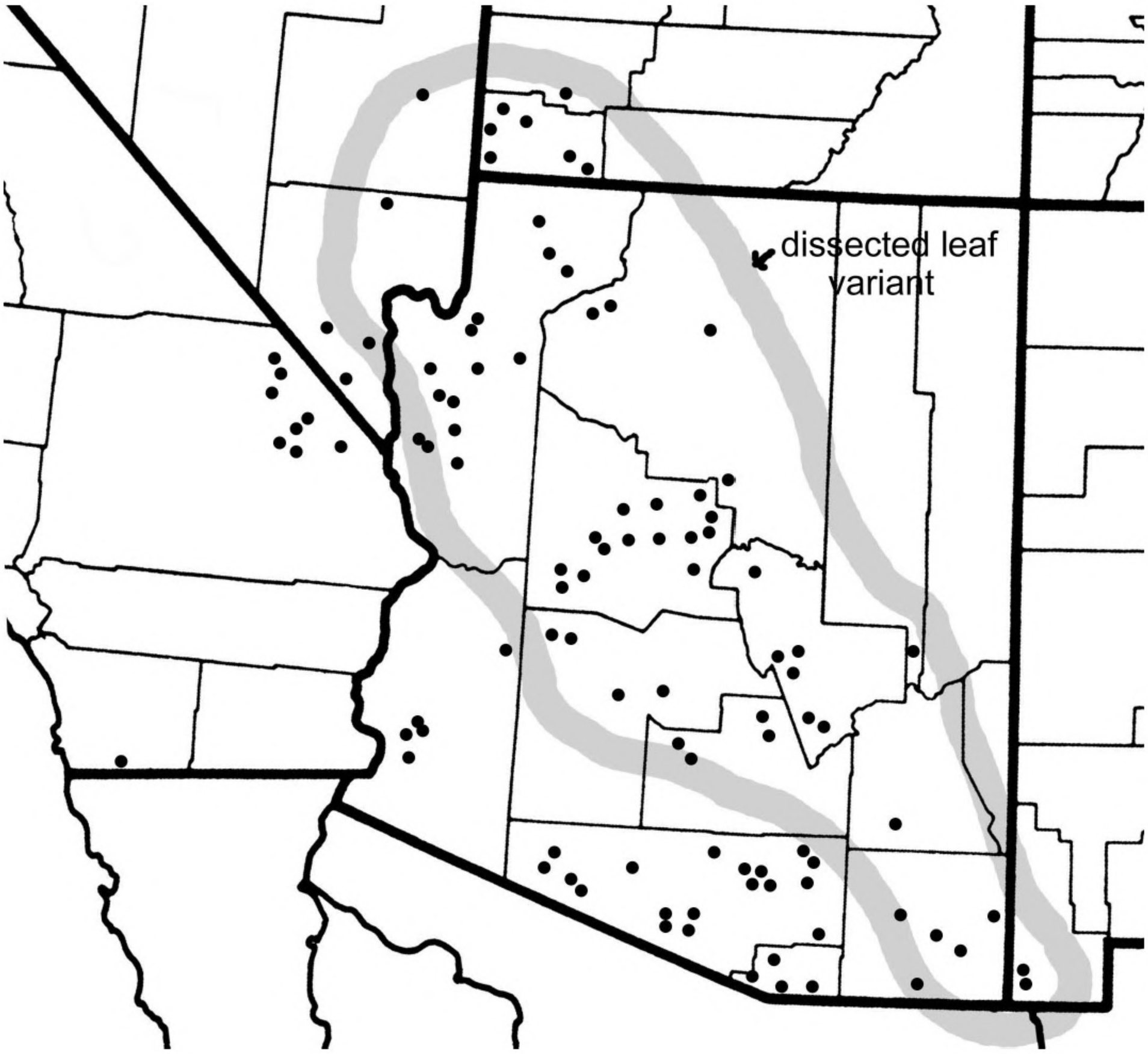

Figure 1. Distribution of *Glandularia gooddingii* in the USA. The distribution continues into Mexico, south into Sonora and Sinaloa and west into Baja California. Records are based on collections from ARIZ, TEX-LL, and UNM and from other sources as noted in the text. The record for southern San Diego County, California, is discussed in the text. Variants with dissected leaves are mostly within the area bounded by the shaded line (see text for comments).

387560
TEX
0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
Studies in Glandularia
Glandularia gooddingii (Briq.) Solbrig
G. Nesom 2010
University of Arizona Herbarium (ARIZ)
PLANTS OF ARIZONA
Verbenaceae
Glandularia gooddingii (Briq.) Solbrig
Pima County,
Santa Catalina Mountains, Gordon Hirabayashi Rec. Area, (Prison Camp) Beside stream bed below the junction of Soldier trail and AZ trail. Several plants. Flower purple.
32° 20.033'N, 110° 43.376'W. Elev. 4770 ft.
Joan Tedford 545 9 Oct. 2007

Figure 2. *Glandularia gooddingii*, leaves coarsely toothed.

HERBARIUM
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721
375034
0 1 2 3 4 5 6 7 8 9 10
cm
copyright reserved
TEX
Studies in Glandularia
Glandularia gooddingii (Briq.) Solbrig
G. Nesom 2010
University of Arizona Herbarium (ARIZ)
Plants of Arizona
Glandularia gooddingii (Briq.) Solbrig
Pima County. Organ Pipe Cactus National Monument; Bull Pasture, Ajo Mountains.
32° 00.876' N, 112° 42.856' W (GPS, NAD 27); 3215 ft.
Associated species: Encelia farinosa, Simmondsia chinensis, Ephedra aspera, Viguiera parishii, Parkinsonia microphylla, Guiterrezia serothrae, Eirogonum wrightii, Circium neomexicanum, Astroplepis cochisensis, Senna covesii, Dichelostemma capitatum, Janusia gracilis, Festuca octoflora, Cryptantha barbigera, Lepidium lasiocarpum, Uropappus lindleyi. Etc.
Rocky, shallow soil.
Richard S. Felger 05-187
With: Erik F. Enderson
9 April 2005

Figure 3. *Glandularia gooddingii*, leaves coarsely toothed to incised.

Figure 4. *Glandularia gooddingii*, leaves coarsely toothed to moderately dissected.

Figure 5. *Glandularia gooddingii*, leaves dissected.

University of Arizona
HERBARIUM
355909
TEX
cm 0 1 2 3 4 5 6 7 8 9 10
copyright reserved
Studies in Glandularia
Glandularia gooddingii (Briq.) Solbrig
G. Nesom 2010
253
VERBENACEAE
Yavapai County
Glandularia gooddingii (Briq.) Solbrig
Apache Creek Wilderness Area; N38 64 400 E3 28 800; T18N R6W SW¼ SW¼ section 26, 5250 feet, NW bank of Apache Creek, ca. 3k WSW of its confluence with Walnut Creek, granitic hills with Juniperus deppeana, Rhus trilobata, Quercus turbinella, Forestiera pubescens, Eriogonum wrightii, Echinocereus fendleri, Agoseris heterophylla, Astragalus tephrodes, Castilleja integra, Cheilanthes fendleri, Claytonia perfoliata, Corydalus aurea, Cryptantha cinerea, C. circumsissa, C. micrantha, C. muricata, C. pterocarya, Dichelostemma pulchellum, Eriastrum diffusum, Erigeron colomexicanus, Glandularia gooddingii, Hybanthus verticillatus, Hymenopappus filifolius, Lappula redowskii, Layia glandulosa, Lepidium virginicum, Lomatium nevadense, Lotus humistratus, L. wrightii, Matelea producta, Microseris lindleyi, M. gracilis, Myosurus cupulatus, Oenothera cespitosa, Pellaea mucronata, Phacelia affinis, Plantago patagonica, P. virginica, Senecio multilobatus, Townsendia exscapa, Tragia ramosa, Allophyllum gilioides, Collinsia parviflora, Cryptantha nevadensis, Descurainia pinnata, Erigeron concinnus, Gilia ophthamoides, Lupinus concinnus, Plagiobothrys collinus, and P. tenellus.
Leaves dark gray-green; flowers pale violet.
Theresa Wright 92-76 9 May 1992
M. Baker

Figure 6. *Glandularia gooddingii*, leaves strongly dissected, bipinnatifid.